Nutri-Facts
Phytochemicals

What are phytochemicals?

Phytochemicals are plant chemicals that contain protective, disease-preventing compounds. Nearly 1,000 of these chemicals have already been identified, and many more continue to be identified today. This is an exciting and promising area of nutrition research, as phytochemicals are associated with the prevention and/or treatment of at least four of the leading causes of death in the United States—heart disease, cancer, diabetes, and hypertension. They have been proven to be involved in many processes, including ones that help prevent cell damage, prevent cancer cell replication, and decrease LDL cholesterol levels.

What are some of the most commonly studied phytochemicals and what are examples of their food sources?

- **Flavonoids** are one subgroup of phytochemicals, and are included in such foods as apples, cherries, soy beans, soy products, chickpeas, licorice, and tea. These are being studied to evaluate their effectiveness against cancer and heart disease.
  - **Phenolic flavonoids** found in red wine and red grape juice can act as antioxidants, protect against LDL oxidation, and inhibit blood clotting, which provides protection against heart disease.
- **Carotenoids,** which lend carrots, cantaloupe, yams, and apricots their orange color, are promoted as anticancer chemicals.
- **Lycopene** is found in tomatoes, red peppers, and red grapefruit and is also touted as a powerful antioxidant.
- **Ellagic acid** is found in strawberries, raspberries, blackberries, walnuts, and cranberries and is also said to be anticancerous.
- **Sulfides**, found in garlic and onions, are reputed to stimulate enzymes that inhibit the growth of bacteria and may reduce the incidence of stomach cancer, lower blood pressure, and strengthen the immune system.

**This is only a partial list of phytochemicals and foods containing them. There are many, many more!*

What is the evidence?

It has long been established that a diet rich in fruits, vegetables, and whole grains is beneficial to health. However, it is only very recently that serious research has started trying to understand the roles phytochemicals play in disease prevention.

Many studies have shown that people who eat higher amounts of fruits and vegetables have about one-half the risk of cancer. This protective effect has also been observed in hormone-related cancers, like breast and prostate cancers. In addition to countless studies showing the anti-tumor activity of several of these compounds, some have potent anti-inflammatory properties (which may be an important finding for people with asthma, arthritis, lupus, etc.) and immune-strengthening abilities.

Furthermore, studies show that people who consume about one to two ounces of soy protein for about four weeks can experience a decrease in total and LDL (bad) cholesterol levels of as much as 10 to 20 percent when initial levels are elevated. This is especially impressive considering that while LDL levels are reduced, HDL (good) levels remain constant. Soy also lowers triglyceride levels, especially in persons with elevated levels.

What about supplements?

Though supplements would seem an easy way to increase phytochemical intake, there is no evidence to support that taking supplements is as beneficial as consuming the whole foods from which they are derived. This is likely because consuming such supplements will only provide certain components in a concentrated form, not the diversity of these compounds that occur naturally in fruits, vegetables, and grains; besides, scientists are still trying to understand the combined effect these compounds have, and optimal levels of phytochemicals have yet to be determined.

How do I work phytochemicals into my diet?

Many Americans eat far below the 5 servings of fruits and vegetables recommended by the National Cancer Institute. People need to realize just how few servings they eat daily, and then look at simple strategies for incorporating fruits and vegetables into their diets. The slogan "eat your colors" is also useful here, as the vivid red, green, yellow, and orange pigments found in these plant foods are often markers for the protective compounds they contain. Some easy suggestions for increasing phytochemical intake are listed below:

- Add chopped fruit to cereal, oatmeal, and yogurt
- Add fresh greens, carrots, celery, broccoli, beans, and peppers to soups and spaghetti sauce
- Keep dried fruits like raisins, apricots, and prunes for snacking instead of chips
- Try replacing sodas and sports drinks with green or black teas
- Add salsa to eggs, and use it in place of creamy dips for raw vegetables
- Replaced processed grains for whole grains. (Refining wheat reduces phytochemical content by 200-300 %.)

Are phytochemicals destroyed by cooking?
Most of the chemicals are heat stable and are not significantly lost in cooking water. Interestingly, some chemicals are actually more easily used by the body when they have been cooked; for example, the lycopene in processed tomatoes (such as in pasta sauces and ketchup) is more available than in raw tomatoes.

Finally, although research is ongoing about the benefits of these chemicals and their role against disease, studies do support that the risks of cancer and heart disease are significantly reduced with increased consumption of fruits, vegetables, and whole grains. Furthermore, they are naturally low in fat, calories, and sodium, and supply an abundance of flavors and textures.

Where can I get more information?

- The American Dietetic Association: www.eatright.org
- The National Cancer Institute: www.nci.nih.gov
- The National Institutes of Health: www.nih.gov
- The Journal of Nutrition: www.nutrition.org

For more information on this and other health and wellness topics, visit Navy Knowledge Online (NKO) at http://www.nko.navy.mil or the Navy Environmental Health Center (NEHC) at http://www-nehc.med.navy.mil/hp.